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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

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CHUAN-BAO WANG et al

Group Art Unit: 1743

Serial No.: 09/771,882

Examiner: Brian J. Sines

Filed: January 30, 2001

For: POISON RESISTANT COMBUSTIBLE GAS SENSORS
AND METHOD FOR WARNING OF POISONING

RESPONSE

Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

Applicants' attorney is appreciative of the interview granted by Examiner Sines and Soderquist on January 22, 2004. At that interview, Applicants' attorney pointed out the distinctions between the art of record and the claimed invention, and the Examiners agreed that a further search of the art would be conducted.

Claims 1 through 4 and 6 through 14 have been rejected under 35 USC 102(b) as anticipated by Jones et al., while Claim 5 has been rejected under 35 USC 103(a) over Jones et al in view of Cheng et al.

The claimed invention is directed to a combustible-gas sensing element comprising an electric heating element, a

first layer coated on the electric element which contains a precious metal catalyst supported on a porous oxide, the precious metal catalyst catalyzing combustion of the combustible gas to be determined by the element, and a second layer overlaying the first layer. The second layer comprises a catalytic compound which is not substantially active toward the combustible gas, but which provides sites which are reactive with and which are capable of trapping gases and vapors which poison the precious metal catalyst. The catalytic compound is supported on a porous oxide. Typical catalytic compounds are recited in Claim 2, and are selected from the groups of metal oxides, solid acids, solid bases and metal-loaded zeolites and clays.

The nature of the invention is discussed on pages 7 and 8 of the specification, where it is stated that the catalytic compounds are not conventional combustible catalyst and are substantially not active towards combustion gases such as methane. However, the catalytic materials provide strong redox, acidic, or basic sites, which are active enough to react with and trap catalyst poisons, and thus prevent the poisons from diffusing into the inner layer to poison the combustion catalyst. It is further pointed out on page 8 of the specification that non-catalytic support material such as alumina and silica contain only weak or very weak acidic, basic, and/or redox sites that can only weakly bind with

poisoning compounds, but that the invention provides porous oxide-supported catalytic material that contain strong redox, acidic, or basic sites, which are chemically active and effective in trapping poisoning materials.

The Jones et al patent discloses a combustible gas detector having a heatable wire filament embedded in a pellet containing a homogeneous mixture of oxidation catalyst and zeolite. The pellet may also contain an inactive ceramic carrier material such as alumina. Around the pellet there may be provided additional areas of catalytically active material and/or inactive non-catalytic porous material, the latter provided to act as a molecular filter. See column 1, lines 45-49.

The molecular filter concept is also disclosed in the Jones et al patent, U.S. 4,123,225, where it is stated that a layer of alumina is provided on the catalytic layer, and that this outer layer of inert non-catalytic porous material prevents non-volatile residues from reaching the catalytically active regions of the detector.

Thus, the Jones et al '228 patent discloses an outer layer which is either a catalytic layer in the manner of the inner layer, or is an inactive non-catalytic material. Jones et al '228 does not disclose or suggest the claimed outer layer, a catalytic compound which is not substantially active towards combustible gases, but which provides sites which are

reactive with gases and vapors which poison the precious metal catalyst. The catalytic compound is thus defined as a compound which is not substantially active toward the combustible gas, but which provides reactive sites with the poisoning materials. Thus, the claimed second layer does not merely absorb the poisoning vapors, but chemically reacts with the poisoning vapors to bind the vapors to the outer layer, and prevent these materials from migrating to the precious metal catalyst layer. This is not disclosed or suggested by the Jones et al '228 reference.

Further, the Office action fails to give proper weight to the language of Claim 1 on the basis that this language provides only a functional limitation. The Office action makes reference to MPEP § 2173.05(g), but in this regard, that section of the MPEP states specifically that "[t]here is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper." The Office action moreover takes the position that the claimed invention is structurally identical to the structure disclosed in the prior art, but Applicants strongly disagree with this point of view. The structural distinction of the present claims is provided in the nature of the chemical compounds themselves, rather than in a mechanical structure, and it is the nature of the chemical compounds themselves which cause the claimed

invention to function very differently from the structures disclosed in the prior art. Moreover, the invention as recited in Claim 2 is not merely functional, but is based on specific chemical compounds and classes of compounds, which are also defined by the functional language of Claim 1. No reason is given in the Office action why the invention recited in Claim 2 should be considered merely functional, and should not define over the prior art.

Withdrawal of these rejections is accordingly requested.

In view of the foregoing remarks, Applicants submit that the present application is in condition for allowance, and an early allowance of the application is earnestly solicited.

Respectfully submitted,



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